



Fact Sheet: Glen Canyon Dam High-Flow Experiment

OVERVIEW

Tributary Sediment Hypothesis: The Glen Canyon Dam high-flow experiment is designed to test a new science-based hypothesis concerning the use of tributary river sediment rather than main-stem bottom sediment to improve Colorado River habitat for endangered fish and wildlife and enhance cultural and recreational resources in Grand Canyon National Park. The goal is to stir up and redistribute more than a million tons of sediment from tributary rivers downstream from the dam to enlarge existing beaches and sandbars, create new ones, and distribute sediment into drainage channels. The test will develop a better understanding of the river's ecosystem to help guide future management decisions in the continued operation of Glen Canyon Dam.

A previous high-flow test at the dam in 1996 was designed to stir up and redistribute sediment from the bottom of the Colorado River and add it to river banks. The hypothesis underlying that test was not borne out by the results, leading scientists to believe that a more effective approach would be to redistribute tributary sediment. More than a million tons of sediment has now accumulated from downstream tributaries, triggering the test.

Water Neutral: The water released during the experiment will not change the amount of water to be released from Glen Canyon Dam in the 2005 Water Year. The Annual Operating Plan calls for releasing 8.23 million acre-feet of water that is sent down river and captured in Lake Mead for use by the Lower Colorado River Basin States. The test flows are factored into that annual volume. Flows later in the year will be adjusted downward to factor in the additional water released during the Nov. 21-25 test. The dam's bypass tubes will be opened for 90 hours. The peak high flows will run for two and one-half days (60 hours) at about 41,000 cubic-feet-per-second. The test will release an additional 224,000 acre-feet from Lake Powell and lower the reservoir by 2 ½ feet.

Stakeholder Consensus: There is unanimous support for conducting this experiment among the members of the Adaptive Management Work Group, including the seven Colorado River Basin states and hydropower customers. The AMWG, a federal advisory committee, recommended the test. The Adaptive Management Program applies scientific knowledge in decisionmaking for the operations of Glen Canyon Dam and protection of downstream resources consistent with the Grand Canyon Protection Act.

Costs of the Test are included in the Adaptive Management Program budget, which is largely funded through hydropower revenues from Glen Canyon Dam. Some additional appropriated funds are included in the budget. Water released above power-plant capacity will not be used to generate power. The National Park Service will extend boat-launch ramps and move docks on Lake Powell and adjust services in Glen Canyon NRA.

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SCIENCE EXPERIMENTS

Experiments will focus on sediment distribution, native fish and food for aquatic animals (see supplemental fact sheet).

Sediment is important for enlarging and building beaches, which are a foundation for terrestrial habitat next to the river and recreational rafters and hikers who camp on them.

Sediment also is important for in-place preservation of archaeological sites and other cultural resources in Grand Canyon National Park. Most sediment entering the Grand Canyon now arrives via Paria River inputs below the dam.

Research will be supported by pre- and post-release remote sensing to determine the condition of beaches and sediment in the system. Aerial photography is complemented by channel-bed mapping and sediment classification using multibeam sonar. Subsequent remote-sensing efforts six and 18 months after the test will track changes in the system.

USGS scientists will focus their investigations on sediment resources, specifically, how much of it moves through the Grand Canyon during the high-flow event and how much is retained as beaches or channel deposits.

Shoreline beaches will be measured by using a combination of conventional survey equipment and airborne Light Detection and Ranging technology that delivers highly accurate topography.

Sediment suspended in the water will be measured using water sampling and a laser-based technology. Measurements will be made of sediment concentration and grain size distribution in the water column at several locations during the high flow to see how this changes as the water moves through the Grand Canyon.

This will give scientists some indication about where and perhaps the conditions under which sand is deposited or eroded by the high flow as it moves through changing geomorphic conditions.

Sediment redistribution also is expected to create backwaters that favor the native humpback chub, an endangered species that is dependent on the Canyon's habitat and has evolved with flood events.

Intensive monitoring and mapping before and after high flows will help to better understand early life stages of humpbacks and how short- and long-term changes in their habitat relate to fish survival.

Scientists will conduct a hoop-net survey to examine the affect of this high flow on juvenile humpback chub near the confluence of the Little Colorado River. Recent surveys showed a high number of juvenile chub in this reach. The 2004 reproduction year yielded some of the largest catches of young-of-the-year chub in many years.

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